PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-119625

(43)Date of publication of application : 23.04.2003

(51)Int.Cl. D01F 8/06
D02G 1/14
D04H 1/54

(21)Application number : 2002-012065

(22)Date of filing : 21.01.2002

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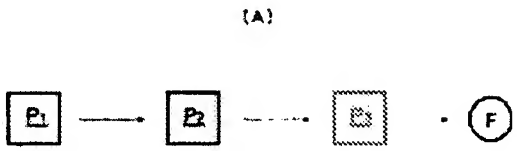
(30)Priority

Priority number : 2001241850 Priority date : 09.08.2001 Priority country : JP

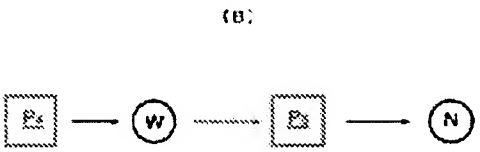
(54) FIBER FOR NONWOVEN FABRIC AND THE RESULTANT NONWOVEN FABRIC AND METHOD FOR PRODUCING THEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a fiber for a nonwoven fabric in the form of an undrawn state of a sheath/core type conjugate fiber obtained by melt spinning, to obtain the nonwoven fabric having high mechanical strengths and bulkiness by thermofusing of a web comprising the above fiber, and to provide respective methods for producing the above fiber and nonwoven fabric.



SOLUTION: This fiber F for the nonwoven fabric is such that undrawn yarns obtained by melt spinning of the sheath/core type conjugate fiber composed of a lower-melting polypropylene-based copolymer as the sheath and a higher-melting isotactic polypropylene as the core are crimped and cut into staple fibers. The 2nd objective nonwoven fabric N is obtained from the above fiber F. The 3rd objective method for producing the fiber F comprises the step P1 of obtaining the undrawn yarns by melt spinning of the conjugate fiber, the step P2 of crimping the undrawn yarns, and the step P3 of cutting the thus crimped undrawn yarns into the staple fibers. The other objective method for producing the nonwoven fabric N comprises the step P4 of forming the web W by using the staple fibers obtained through the steps P1 to P3 and the heating treatment step P5 of subjecting the web W to



thermofusing by hot air.

CLAIMS

[Claim(s)]
[Claim 1]Textiles for nonwoven fabrics, wherein crimp equips an undrawn yarn produced by carrying out melt spinning of the sheath-core type bicomponent fiber characterized by comprising the following with ******** and composition cut by staple fiber.
A sheath which consists of a polypropylene system copolymer of a low melting point.
A core part which consists of AISOTA tic polypropylene of a high-melting point.

[Claim 2]A nonwoven fabric, wherein Webb formed of textiles for nonwoven fabrics which are not extended [according to claim 1] is obtained by hot wind weld processing being carried out.
[Claim 3]The nonwoven fabric according to claim 2, wherein the degree of breaking extension of a mechanical flow direction (MD) is not less than 100% and an extension recovery factor after 100% extension is 50%.
[Claim 4]The nonwoven fabric according to claim 2, wherein a ****** elastic coefficient at the time of 40% extension is 1000 or less.
[Claim 5]In a case where said sheath comprises an ethylene-propylene random copolymer, The nonwoven fabric according to any one of claims 2 to 4 when [said] hot wind weld processing is carried out in a weld temperature range within the limits of 132 ** - 142 **, wherein a ** value is provided with physical properties holding 70 or more cc/g at least.
[Claim 6]In a case where said sheath comprises an ethylene-propylene random copolymer, a weld temperature range within the limits of 132 ** - 142 ** -- said time of hot wind weld processing being carried out -- constant stress deformation -- 155mm/g/mm -- the nonwoven fabric according to any one of claims 2 to 4 having physical properties holding more than ^{2} at least.
[Claim 7]A manufacturing method of textiles for nonwoven fabrics characterized by comprising the following.
A sheath which consists of a copolymer of a low melting point.
A core part which consists of AISOTA tic polypropylene of a high-melting point.

An undrawn yarn formation process which carries out melt spinning of the sheath-core type bicomponent fiber ** constituted, and obtains an undrawn yarn.
A crimp process of giving crimp to said undrawn yarn, and a cutting process which cuts an undrawn yarn by which crimp was carried out and is used as a staple fiber.

[Claim 8]A manufacturing method of a nonwoven fabric characterized by comprising the following.
A sheath which consists of a copolymer of a low melting point.
A core part which consists of AISOTA tic polypropylene of a high-melting point.
An undrawn yarn formation process which carries out melt spinning of the sheath-core type bicomponent fiber ** constituted, and obtains an undrawn yarn.
A crimp process of giving crimp to said undrawn yarn, a cutting process which cuts an undrawn yarn by which crimp was carried out and is used as a staple fiber, the Webb formation process which form Webb using single yarn obtained by the above process, and a heat treatment process which carries out hot wind weld of said Webb.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the nonwoven fabrics produced by heat-treating Webb formed in the state of un-extending from crimp, the textiles for nonwoven fabrics of the short fiber shape acquired by cutting, and these textiles in the sheath-core type bicomponent fiber produced by carrying out melt spinning, and these manufacturing methods.
[0002]
[Description of the Prior Art]The textiles for nonwoven fabrics of the short fiber shape generally formed from the sheath-core type bicomponent fiber of the thermal melting arrival nature which comprised a core part which consists of a sheath which consists of low melting point components, and a high-melting point ingredient used for manufacture of a nonwoven fabric (staple fiber), After melt spinning is carried out with a melt spinning machine, moderate strong ductility is given through a stretching process, and it is cut by the fiber length according to a use, and is formed in him. In order t make sheet shaped Webb easy to make a tangle of textiles and textiles into sufficient thing, and to form, before cutting, it is common to perform crimp processing for the extended linear shape textiles by a crimper etc., and to give crimp (crimp).
[0003]Here, since the row of the chain inside textiles is almost disorderly in the state of un-extending, extending in the manufacturing process of the raw cotton for nonwoven fabrics is based on the common-sense-ized knowledge of becoming what cannot use single fiber strength low. That is, if a single fiber is extended several times at the temperature below the melting point after a spinning process, the chain which constitutes textiles is located in a line in accordance with the direction of a fiber axis (a stacking tendency becoming high), and it is supposed that the textiles for nonwoven fabrics provided with moderate strong ductility can be obtained. By establishing a stretching process, textiles are more thickly extruded from the hole of the spinneret of a melt spinning machine, and the single yarn of predetermined thickness can be obtained by extension.
[0004]By the way, temporarily, if the manufacturing method which does not perform the stretching

process which was not adopted is assumed, in order to extrude textiles thinly in the stage of melt spinning, it is necessary to make spinning speed high by the former, but, and, Since troubles, such as thread breakage, will occur frequently if spinning speed is made high, it is necessary to make melt spinning speed into a low speed. For this reason, it is predicted easily that productivity falls. Since it is such, also when to perform a stretching process is made into technical common knowledge and it uses the bicomponent fiber of a sheath-core type after melt spinning conventionally, it is thought that it was not an exception.

[0005]

[Problem(s) to be Solved by the Invention]With however, the load in this stretching process if the conventional commonsense manufacturing method is applied and it extends to a sheath-core type bicomponent fiber. Technical problem of the interface of a sheath and a core exfoliating and reducing single yarn strength remarkably, And the chain orientation of the adhesive resin of a sheath component advanced by extending, and invention-in-this-application persons newly found out technical problem that the adhesion temperature requirement for acquiring the nonwoven fabric physical properties the melting point of resin itself not only rises, but used practical became narrow.

[0006]In a manufacturing method provided with the conventional stretching process. The sheath which consists of a polypropylene system copolymer of a low melting point, the core part which consists of AISOTA tic polypropylene of a high-melting point, and the nonwoven fabric manufactured with the sheath-core type bicomponent fiber ** constituted, Since the melting point difference of a sheath component and a core component is small, it is conventionally formed with the point seal (pressurized contact heating process) chiefly. For this reason, when it is difficult for the hot wind fusion processing as which low shrinkage nature and low temperature adhesion are required of single yarn to aim at deployment and hot wind fusion processing is performed. The loft equivalent to the nonwoven fabric manufactured with the polyethylene / polypropylene bicomponent fiber which has generally spread as a bicomponent fiber by which hot wind weld (exhaust air through weld) is carried out was hard to be obtained.

[0007]Since intensity fell as compared with extension single yarn, and ductility became large and the intensity of the nonwoven fabric fell, as for unextended single yarn, general recognition of being unsuitable existed. However, in a sheath-core type bicomponent fiber, the problem of a fall of the single yarn strength by not extending does not influence so much, The problem which a part of exfoliation of a sheath-core interface generates in a stretching process rather was larger, and it newly became clear that the intensity of a nonwoven fabric depended for Webb greatly to the pasting up point destruction by the complete avulsion from the core component of the sheath component pasted up between [when carrying out thermal melting arrival] textiles.

[0008]Then, the textiles for nonwoven fabrics which formed the sheath-core type bicomponent fiber produced by this invention's converting greatly and carrying out melt spinning of the conventional way of thinking that it is necessary to establish a stretching process after the melt spinning of a sheath-core type bicomponent fiber in the state of un-extending, It aims at providing the nonwoven fabrics

which are excellent in the setting-proof [intensity, a loft, soft nature, and] nature and heat-sealing nature which are produced by thermal melting arrival acting as Webb who consists of these textiles for nonwoven fabrics, and these manufacturing methods.

[0009]

[Means for Solving the Problem]In order to attain the above-mentioned purpose and to solve above-mentioned technical problem, in this invention. First, a sheath which consists of a polypropylene system copolymer of a low melting point, a core part which consists of AISOTA tic polypropylene of a high-melting point, and an undrawn yarn produced by carrying out melt spinning of the sheath-core type bicomponent fiber ** constituted are provided with textiles for nonwoven fabrics which cut crimp to ******** and a staple fiber.

[0010]Both 2 element-system copolymers, such as an ethylene-propylene random copolymer, and a ternary system copolymer (TAPORIMA) are employable as a copolymer of a sheath. a case where ar ethylene-propylene random copolymer is used for a sheath -- content of ethylene -- 2 to 10% of range -- a thing of 3 to 8% of range can be used preferably. The isotactic polypropylene used for a core part should just be publicly known crystalline polypropylene for textiles.

[0011]Textiles for nonwoven fabrics concerning this invention can be obtained by giving and cutting about 8-20 machinery [/inch] crimp or natural crimp based on a spinning means of a conventional method to an undrawn yarn obtained by obtaining a sheath-core type bicomponent fiber by melt spinning.

[0012]In the above means, since it does not extend to a sheath-core type bicomponent fiber obtained by melt spinning, load of extension is not applied to single yarn by which melt spinning was carried out. For this reason, there is an advantage that interfacial peeling of a sheath and a core part can be lost. Sectional shape of a heat adhesive property bicomponent fiber adopted by this invention is applicable to concentric type and eccentricity type all.

[0013]Next, textiles for nonwoven fabrics obtained by the above-mentioned means in this invention, Since a heat shrinkage rate is provided with the characteristic [it is few and] that excel in weld nature in a low temperature region, and adhesion strength is large, By carrying out hot wind weld (exhaust air through weld) processing of Webb formed of these textiles for nonwoven fabrics, a nonwoven fabric of new quality excellent in setting-proof [a loft, soft nature, and] nature and heat-sealing nature can be provided.

[0014]This nonwoven fabric is [the degree of breaking extension of a mechanical flow direction (MD) of new quality of such a nonwoven fabric] not less than 100% first, And it is embodied by having physical properties that an extension recovery factor after 100% extension is 50% ("the degree of breaking extension" and an extension recovery factor after 100% extension of a mechanical flow direction (MD) are only hereafter written for the degree of breaking extension of a mechanical flow direction (MD) as "an extension recovery factor after 100% extension").

[0015]When ductility is lengthened to 200 mm 50% when "ductility" showed an extension rate (extension rate) when compared with initial length of a nonwoven fabric in an application concerned,

for example, a nonwoven fabric 100 mm in length was lengthened to 150 mm, ductility is indicated to be 100%. "The degree of breaking extension" means ductility at the time of maximum load when a nonwoven fabric is lengthened (point of rupture), and with an "extension recovery factor." When the target nonwoven fabric is pulled (it was made to elongate), it is an index which shows how much it recovers to initial length, for example, "an extension recovery factor after 100% extension is 50%" means returning to one 1.5 times the length of initial length, when it pulled and detaches initial length's twice.

[0016]That is, since it is not fractured even if a nonwoven fabric concerning this invention extends a nonwoven fabric to about 2 times, and an extension recovery factor moreover shows 50% after 100% of ductility, the characteristic near an elastic body like rubber is demonstrated. Such physical properties are physical properties never acquired in the conventional hot wind weld nonwoven fabric formed for textiles which contribute in the above-mentioned new quality clearly, and were extended.

[0017]Next, the above-mentioned new quality of a nonwoven fabric concerning this invention is embodied when this nonwoven fabric is provided with physical properties that a ****** elastic coefficient at the time of 40% extension is 1000 or less.

[0018]in addition -- an application concerned -- setting -- "-- ****** -- an elastic coefficient -- " -- a nonwoven fabric -- extension -- ease -- extension -- recoverability -- being shown -- an index -- it is -- {-- [-- extension -- the time -- load -- (-- gf --) -- / -- extension -- a recovery factor -- (-- % --) --] -- x -- eyes (g/m^2) -- x -- weld -- temperature -- (-- ** --) --} -- / -- 100 -- asking -- having . When formed of a non-drawn fiber, a nonwoven fabric concerning this invention this coefficient, it cannot predict from th conventional nonwoven fabric -- since it became clear that it was markedly alike and had outstanding new elasticity, it is the index thought out by a result to which invention-in-this-application persons repeated examination wholeheartedly so that these new physical properties may be evaluated exactly and can be specified. That is, this index is an index peculiar to a nonwoven fabric formed of a non-drawn fiber, and is based on a completely new technical idea.

[0019]A nonwoven fabric can be elongated by small power and excelling in recoverability moreover can judge objective, so that a numerical value of this "****** elastic coefficient" is small. A nonwoven fabric which a common nonwoven fabric formed by the conventional drawn fiber requires for this invention while a ****** elastic coefficient shows 1500 or more numerical values is provided with big elasticity which this coefficient is 1000 or less and cannot predict in the former, and these physical properties have contributed in the above-mentioned new quality clearly.

[0020]In a case where a sheath is constituted from an ethylene-propylene random copolymer by this invention. In a weld temperature range within the limits of 132 ** - 142 ** when [said] hot wind weld processing is carried out, a nonwoven fabric provided with physical properties in which **** holds 70 or more cc/g, or a weld temperature range within the limits of 132 ** - 142 ** -- said time of hot wind weld processing being carried out -- constant stress deformation -- 150-mm[/g]/mm -- a nonwoven fabric provided with physical properties holding more than ^{2} can be provided.

[0021]When hot wind weld processing is carried out in the range concerned of 134 ** - 142 ** at least

a nonwoven fabric specified by said contents of physical properties, It specifies that it is the thing having at least physical properties which can hold both [either or] a ** value beyond said predetermined value, or said predetermined value, [of the amount of deformation under loads] [both] The range of weld temperature in hot wind weld processing of a nonwoven fabric manufacturing process itself is not necessarily specified or limited. That is, it is free to perform hot wind weld processing out of said weld temperature requirement to Webb who comprised textiles for nonwoven fabrics concerning this invention according to the purpose or manufacturing conditions itself.

[0022]A Reason for not having specified bulky upper limit and upper limit of the amount of deformation under loads, It is because it can distinguish or distinguish from the physical properties of nonwoven fabrics other than this invention clearly only by specifying the physical properties of a loft demonstrated characteristic in a nonwoven fabric concerning this invention, or soft nature by a lower limit, so extension of an invention does not become indefinite.

[0023]A sheath-core type bicomponent fiber used for a nonwoven fabric concerning this invention, Originate in extension not being given at all and molecular orientation of a sheath component is controlled, There are few heat shrinkage rates, and since there was no rise of the melting point and it was proved [person / this invention] that it had the characteristic of excelling in weld nature in a low temperature region, it becomes possible to provide Webb suitable for hot wind weld (exhaust air through) processing. And if this Webb is used, a nonwoven fabric excellent in setting-proof [a loft, so nature, and] nature and heat-sealing nature can be provided. The amount of heat of fusion of a sheath is also large, and practically sufficient nonwoven fabric strength can be obtained from sheath-core interfacial peeling not happening.

[0024]It becomes easy to provide a nonwoven fabric which comprised textiles with larger fineness an was excellent in a loft from unextended textiles for nonwoven fabrics being used for a nonwoven fabric concerning this invention. Since distance between textiles and an opening become large, this nonwoven fabric will become suitable as facing, such as a top sheet of a diaper in which fluid permeability is demanded, a sublayer, sanitary items.

[0025]Since a nonwoven fabric concerning this invention is excellent in elasticity, it is excellent in bulk recovery nature when constant stress is applied, or gestalt recoverability [as opposed to / get twisted and / **********]. Change of thickness at the time of load is large, and while holding soft tactile feeling the touch, and aesthetic property, it is suitable for especially the above-mentioned use from having the characteristic of excelling also in elasticity.

[0026]Next, in this invention, "a manufacturing method of textiles for nonwoven fabrics" which comprised a process of following (1) - (3) is provided.

(1) An undrawn yarn formation process which carries out melt spinning of the sheath-core type bicomponent fiber ** constituted to a sheath which consists of a copolymer of a low melting point, anc a core part which consists of AISOTA tic polypropylene of a high-melting point, and obtains an undrawn yarn.

(2) A crimp process of giving crimp to said undrawn yarn.
(3) A cutting process which cuts an undrawn yarn by which crimp was carried out and is used as a staple fiber.
[0027]And "a manufacturing method of a nonwoven fabric" which comprised a process of the following (4) and (5) is provided.
(4) The above (1) Webb formation process which forms Webb using single yarn obtained from a process of - (3).
(5) A heat treatment process which carries out hot wind weld of said Webb.
[0028]In this manufacturing method, since a stretching process is not included at all in process while being able to provide textiles for nonwoven fabrics and a nonwoven fabric provided with the above-mentioned characteristic, there is a big advantage that the stretching device itself becomes unnecessary. That is, since energy concerning time and effort, a steam, and electrical and electric equipment which can reduce apparatus cost used by a manufacturing process, and are generated at the time of extension can be saved, a production cost can also be reduced.
[0029]As mentioned above, this invention has technical meaning of providing the nonwoven fabric manufacture industry, the clothes manufacture industry, the sanitary industry, etc. with quality textiles for nonwoven fabrics obtained in the state of un-extending using a sheath-core type bicomponent fiber by which melt spinning was carried out, nonwoven fabrics, and such production technology. A sheath which consists of a polypropylene system copolymer of a low melting point and a core part which consists of AISOTA tic polypropylene of a high-melting point, By supposing un-extending a sheath-core type bicomponent fiber ** constituted, it improves so that it may have low shrinkage nature and low temperature adhesion, and it has technical meaning of enabling nonwoven fabric manufacture by hot wind fusion processing.
[0030]
[Embodiment of the Invention]Next, it explains, referring to for the suitable embodiment of this invention the Drawings and the table which were attached. First, the suitable manufacturing method c the nonwoven fabric obtained from the textiles for nonwoven fabrics and these textiles for nonwoven fabrics concerning this invention is explained. Drawing 1 (A) is a process flow figure which expresses simply the process of the manufacturing method of the textiles for nonwoven fabrics concerning this invention.
[0031]The process shown by numerals P_1 of drawing 1 (A), The sheath which consists of copolymers such as an ethylene-propylene random copolymer, other random copolymers, etc. of a low melting point, Melt spinning of the sheath-core type bicomponent fiber ** constituted is carried out to the core part which consists of AISOTA tic polypropylene of a high-melting point, and the "undrawn yarn formation process" which obtains an undrawn yarn until it gives and takes over convergence oils is expressed. The melt spinning in this process P_1 can use the existing sheath-core type bicomponent fiber spinning equipment. The single yarn fineness by which melt spinning was carried out is 2 - 20dtex more preferably one to 30 dtex (deci textile).

[0032]The process shown by numerals P_2 of drawing 1 (A) expresses the crimp process of giving crimp to the undrawn yarn obtained by said undrawn yarn formation process P_1. This crimp process P_2 makes a tangle of textiles and textiles sufficient thing, carries out for the purpose of making sheet shaped Webb easy to form, and gives machinery crimp or natural crimp to linear shape textiles using crimper equipment of the existing stuffing-box type etc.

[0033]A number of crimp is 12-18 pieces/inch, and 8-20 percentage of crimp/inch is 12 to 18% more preferably 10 to 20%. In the carding machine as for which an opening sheet (web) changes a single fiber as it is percentage of crimp lower than this range, It is because there is a problem of productive efficiency falling that it is easy to produce faults, such as generating of waste cotton etc., and there are problems, such as becoming easy to generate formation spots, when a debt of textiles is too strong and manufactures a web with a carding machine when percentage of crimp is higher than this range.

[0034]The process shown by numerals P_3 of drawing 1 (A) is a process which cuts the undrawn yarn by which crimp was carried out and is used as a staple fiber. This cutting process P_3 is the process o making the single yarn by which crimp was carried out and giving oils, and performing the drying process in prescribed temperature, cutting into predetermined fiber length, and obtaining what is called staple fiber of short fiber shape.

[0035]By process P_1 of a more than - P_3, the textiles F for nonwoven fabrics concerning this inventior can be manufactured. Since these textiles F for nonwoven fabrics are provided with a low melting point, low shrinkage nature, and the high amount of heat of fusion, they do not have sheath-core interfacial peeling by extension, and are preferred especially as a use of nonwoven fabric formation.

[0036]Next, drawing 1 (B) is a process flow figure which expresses simply the manufacturing process of the nonwoven fabric manufacturing method concerning this invention. First, numerals P_4 shown in drawing 1 (B) is the process of making said textiles F for nonwoven fabrics distributing and depositinç and forming sheet shaped Webb W. For example, it lets the textiles F for nonwoven fabrics pass to the existing roller card machine etc., and Webb W of the uniform thickness of predetermined eyes according to the desired purpose is formed.

[0037]Numerals P_5 shown in drawing 1 (B) is the heat-treatment process of carrying out hot wind wel of Webb W obtained from Webb formation process P_4. This Webb formation process P_4 is a process performed in order to combine Webb's W textiles so that it may not drop out. The hot wind weld (exhaust air through) device adjusted at the predetermined wind speed is selectively used for this process P_5, and it supplies Webb W to this hot wind fusing equipment with a prescribed speed. And the hot wind weld nonwoven fabric N can be obtained predetermined time and by heat-treating by the hot wind of prescribed temperature.

[0038]

[Example]Hereafter, working example and the comparative example of the textiles F for nonwoven fabrics concerning this invention are explained.
[0039]. <Working example 1-1 (working example of textiles F for nonwoven fabrics concerning this invention)> MFR (value measured based on ASTM D (L)) is [the melting point] 135 ** in 20. The ethylene-propylene random copolymer (product name: Idemitsu polypropylene Y2043GP, product made from Idemitsu Petrochemistry) of 4.3% of ethylene content was used as low melting point polymer of a sheath component. On the other hand, MFR used polypropylene (product name: Idemitsu polypropylene Y2005GP, product made from Idemitsu Petrochemistry) of the high crystallinity type which is the melting point of 165 ** as high melting point polymer used as a core component by 20. The same mind sheath-core type bicomponent fiber spinning equipment provided with two 1 axis extrusion machines and the nozzle for bicomponent fibers with a hole diameter of 0.4 mm is used, Melt spinning was carried out adhering a spinning oil agent on condition of for 900-m/in the spinning temperature of 280 **, and taking over speed, and the area ratio of a sheath and a core part obtained the same mind sheath-core type bicomponent fiber in the state where single yarn fineness is 3.7dtex in 5:5 and where it does not extend. Subsequently, in [collect the multifilament which consists of this same mind sheath-core type bicomponent fiber, and] staple fiber trial production equipment, The 1st draw roller temperature was 30 **, the 2nd and 3rd draw roller temperature was 30 **, and the drawing bath did not heat but gave machinery crimp by the crimper, without making the 1st draw roller, the 2nd draw roller, and the 3rd draw roller into the speed, and applying draw magnification. Then, finishing oils were given, the drying process was performed at 80 **, the cutter device cut to 51 mm of fiber length, and single yarn fineness obtained the textiles for nonwoven fabrics which consist of staple fiber of 3.7dtex. The physical properties which consist of the fineness of the obtained single yarn, a number of crimp, percentage of crimp, and a single yarn heat shrinkage rate were measured. The measurement result was shown in Table 1. The intensity of singl yarn and ductility, and a single yarn heat shrinkage rate were measured according to JIS L 1015.
[0040]. <Working example 1-2 (working example of textiles F for nonwoven fabrics concerning this invention)> MFR (value measured based on ASTM D (L)) is [the melting point] 132 ** in 30. The ethylene-propylene random copolymer (product name: PM940M, made in Sun Alomar) of 5.0% (higher than working example 1-1) of ethylene content was used as low melting point polymer of a sheath component. On the other hand, polymer with a same melting point [as what was used by the core component of above-mentioned working example 1-1] of 165 ** was used for high melting point polymer used as a core component. Since textiles manufacturing conditions are the same as above-mentioned working example 1-1, they omit explanation.
[0041]Melt spinning is performed using the same material as <comparative example 1 (comparative example of textiles F for nonwoven fabrics concerning this invention)> above-mentioned working example 1, After obtaining a same mind sheath-core type bicomponent fiber, the 1st drawing-bath temperature of the same staple fiber trial production device as working example 1 is set as 90 **, 1 step stretching 2.0 times the draw magnification of this was performed between the 1st draw roller

and the 2nd draw roller, heat-adhesive fiber of single-yarn-fineness 3.7dtex was obtained, and crimp and cutting were performed on the same conditions as working example 1. The physical properties of the obtained single yarn were measured according to JIS L 1015. A measurement result is shown in Table 1.

[0042]

[Table 1]

測定項目（単位）	実施例１－１	実施例１－２	比較例１
繊度　（ｄｔｅｘ）	３．７	３．７	３．７
強度（ｃＮ／ｄｔｅｘ）	１．５	１．５	２．２
伸度（　％　）	３８４．６	５０４．８	２４９．３
捲縮数（ケ／２５ｍｍ）	１３．３	１５．２	１２．３
捲縮率（　％　）	１４．７	１５．４	１８．２
繊維長（　ｍｍ　）	５０	５０	５０
熱収縮率（　％　）	０．６	０．５	２．６

[0043]From Table 1 shown above, each heat shrinkage rate of the textiles for nonwoven fabrics concerning working example 1-1 and working example 1-2, That there is almost no contraction by heating when it is dramatically small and nonwoven-fabric-izes with about 1/4% [0.6] of the comparative examples 1 and 0.5% is suitable 1.5% or less, especially suitable 1.0% or less, assumed as a single yarn heat shrinkage rate clear and suitable as a use of a hot wind weld nonwoven fabric. Therefore, the textiles for nonwoven fabrics concerning this invention are dramatically suitable for the nonwoven fabric use.

[0044]Hereafter, working example and the comparative example of the nonwoven fabric N concerning this invention are explained.

[0045]It lets the textiles for nonwoven fabrics obtained by <working example 2 (working example of nonwoven fabric N concerning this invention)> above-mentioned working example 1-1 pass to a 350-mm-wide roller card machine (the Daiwa-kiko CORP., Ltd. make, sample roller card:SC360DIR), Uniform Webb of eyes 25 g/m^2 was formed on condition of discharge velocity 9.5 m/min. Subsequently, this Webb was supplied to the hot wind fusing equipment adjusted to a 2 m/second wind speed the speed for 5-m/, it processed for 5 seconds with the hot blast temperature of 136 **, and the hot wind weld nonwoven fabric was obtained. Except having changed hot blast temperature with 134, 138, and 140 or 142 **, it is the same conditions and the hot wind weld nonwoven fabric wa obtained, respectively. And the strength of each nonwoven fabric, **, the degree of breaking extension, constant stress deformation, and elastic percentage reduction were measured. The measurement result was shown in Table 2 which carries out cited below.

[0046]The measuring method of the nonwoven fabric physical properties adopted by above-mentioned working example 2, working example 3-5 mentioned later, and the comparative example 2 is as follows.

The strength (MD strength) of the flow direction of the strength of a nonwoven fabric and the <degree of breaking extension> machinery started a sample 50 mm in width, and 140 mm in length from the obtained nonwoven fabric, and measured it about this sample on condition of 100 mm of zipper intervals, and hauling speed 40 mm/min. The strength (CD strength) of the direction which intersects perpendicularly with a mechanical flow started a sample 50 mm in width, and 100 mm in length from the obtained nonwoven fabric, and measured it about this sample on condition of 60 mm of zipper intervals, and hauling speed 40 mm/min. A nonwoven fabric strong unit of force is N (Newton) (1kgf=1kgx9.80665m/s^2=9.80665N). The degree of breaking extension of a mechanical flow direction is ductility of the maximum load point (point of rupture) in MD powerful measurement in measurement of the above-mentioned strength.

Ten samples (5 cm x 5 cm) were started from the nonwoven fabric <bulky of a nonwoven fabric> Obtained, and it asked for bulky by the formula which consists of bulky (cm^3/g) =V/M=5x5xh(height)/M based on volume (V) of these samples, and weight (M). The volume (cm^3) 30 seconds after [whole] **** when V applies 20 g of load for the sample of ten sheets for 30 seconds on it in piles and M, As for the total weight (g) of the sample of ten sheets, and h, it asked for the sample of ten sheets in the height (cm) 30 seconds after [whole] **** when 20 g of load is applied for 30 seconds on it in piles.

<Constant stress deformation> From the obtained nonwoven fabric, ten samples (5 cm x 5 cm) were started, and were piled up, and the acrylic board of 5 cm x 2 mm of 5 cmx thickness was carried on it In the compression test mode of a universal testing machine (trade name: RTA-100, product made from ORIENTEC), a compression point position is moved to the grade which is not contacted only in said acrylic board grip. At this time, it checked that compressive load was zero and this point was made into zero point of compression-set displacement. Compression is suspended, when it compresses with the test period of 5 mm/min and compressive load is set to 100 g (0.04g[/mm] ^{2}), The amount of displacement at that time was read, and constant stress deformation was computed based on a formula called amount (mm) of nonwoven fabric constant stress deformation (mm/g/mm^2) = displacement / 0.04 (g/mm^2). This constant stress deformation serves as an index of the softness o a nonwoven fabric, tactile feeling, and a hand, shows that it has the characteristic which changes greatly by small power when this constant stress deformation is large, and is understood that that nonwoven fabric is soft.

The same conditions as <elastic percentage reduction> constant stress deformation measurement, and when compressive load is set to 100 g, compression is suspended, and it is neglected 3 mm. The compressive load after 3-minute neglect was read, and elastic percentage reduction was computed with the following formula. Elastic percentage reduction (%) = [(100-P) /100] x100. P expresses the compressive load after 3-minute neglect. This elastic percentage reduction is an index showing the setting-proof nature of a nonwoven fabric.

When elastic percentage reduction is small, the setting-proof nature of the nonwoven fabric is excellent.

[0047]Except having carried out spinning by a part for 680-m/in <working example 3 (working example of nonwoven fabric N concerning this invention)> taking over speed, it is the same condition as above-mentioned working example 1-1, and the textiles for nonwoven fabrics of single-yarn-fineness 6.6dtex were obtained. And the hot wind weld nonwoven fabric was obtained with the same manufacturing method as above-mentioned working example 2, respectively with the hot blast temperature 134, 136, and 138 and a 140 or 142 ** monograph affair. The physical properties of this hot wind weld nonwoven fabric were measured by the same method as the above. A measurement result is shown in the following table 2.

[0048]Except having carried out spinning by a part for 450-m/in <working example 4 (working example of nonwoven fabric N concerning this invention)> taking over speed, it is the same condition as above-mentioned working example 1-1, and the textiles for nonwoven fabrics of single-yarn-fineness 10dtex were obtained. And the hot wind weld nonwoven fabric was obtained with the same manufacturing method as above-mentioned working example 2, respectively with the hot blast temperature 134, 136, and 138 and a 140 or 142 ** monograph affair. The physical properties of this hot wind weld nonwoven fabric were measured by the same method as the above. A measurement result is shown in Table 2 which carries out cited below.

[0049]It let the textiles for nonwoven fabrics obtained by <working example 5 (working example of nonwoven fabric N concerning this invention)> above-mentioned working example 1-2 pass to the 350-mm-wide roller card machine, and uniform Webb of eyes 25 g/m^2 was formed. Subsequently, thi Webb was supplied to the hot wind fusing equipment adjusted to a 2 m/second wind speed the speec for 5-m/, it processed for 5 seconds with the hot blast temperature of 136 **, and the hot wind weld nonwoven fabric was obtained. The hot wind weld nonwoven fabric was obtained as the same conditions, respectively except having changed hot blast temperature to 132, 134, and 136 or 138 **. And the strength of each nonwoven fabric, **, constant stress deformation, and elastic percentage reduction were measured. The measurement result was shown in Table 2 which carries out cited below.

[0050]The hot wind weld nonwoven fabric was obtained with the hot blast temperature 136, 138, and 140 and a 142 or 144 ** monograph affair under the manufacturing conditions of the nonwoven fabric which shows above-mentioned working example 2 the textiles for nonwoven fabrics obtained by the <comparative example 2 (comparative example of nonwoven fabric N concerning this invention)> above-mentioned comparative example 1. The physical properties of each hot wind weld nonwoven fabric were measured by the same method as the above. A measurement result is shown in the next table 2. "Et-cont" in Table 2 expresses the ethylene content of low melting point polymer of a sheath component.

[0051]

[Table 2]

	Bi-comt (%)	熱融着温度 (℃)	目付(g/m²)	不織布強力(N) CD	MD	MD/CD比	重(α/g)	破断伸度(%)	定荷重変形量 (mm/g/mm²)	弾性減少率 (%)
実施例2	4.3	134	25.0	5.3	28.6	5.4	95	104.0	195.2	22.3
		136	27.0	12.2	40.2	3.3	86	118.7	162.2	22.9
		138	22.0	11.9	39.7	3.3	94	113.8	170.5	20.8
		140	22.6	14.3	42.2	3.0	86	110.0	156.4	19.7
		142	24.6	14.5	45.8	3.2	84	110.2	155.9	19.9
実施例3		134	23.7	8.4	27.0	3.2	103	105.3	302.5	20.6
		136	24.4	11.8	35.8	3.0	99	115.0	275.2	20.4
		138	20.2	10.3	32.5	3.2	101	109.9	257.5	20.0
		140	23.4	11.1	34.3	3.1	91	121.5	250.3	21.1
		142	25.5	13.0	38.0	2.9	86	116.4	247.4	20.6
実施例4		134	27.2	10.3	32.3	3.1	87	120.2	302.5	22.2
		136	29.9	16.3	39.7	2.4	78	141.4	265.9	22.0
		138	28.1	15.5	40.4	2.6	76	137.6	257.5	21.6
		140	28.1	17.2	37.7	2.2	72	115.6	258.1	21.7
		142	25.6	17.5	37.2	2.1	71	118.0	257.5	21.8
実施例5	5.0	132	23.7	5.5	29.5	4.7	89	102.9	175.2	21.5
		134	26.9	8.9	35.7	4.9	88	125.8	165.0	21.4
		136	24.1	8.6	32.9	4.0	85	106.0	163.5	21.6
		136	24.4	11.6	35.5	3.4	84	108.3	160.0	21.8
比較例2	4.3	138	23.4	1.3	12.1	9.5	82	—	106.5	27.4
		138	22.4	3.7	26.3	7.1	69	34.1	98.5	25.9
		140	22.7	10.0	46.6	4.7	59	—	96.3	25.9
		142	24.1	10.5	51.3	4.9	54	—	86.6	25.3
		144	24.4	12.2	55.5	4.6	52	65.2	84.0	23.6

[0052]The data shown in this table 2 was based, and the nonwoven fabric strength (CD), the nonwoven fabric strength (MD) and ** to change of weld temperature (**), the degree of breaking extension, constant stress modification, and change of each elastic percentage reduction were expressed to drawing 2 - drawing 5.

[0053]The nonwoven fabric applied to this invention from the above-mentioned table 2, drawing 2 - drawing 5 has large nonwoven fabric strength (CD, MD) also at the weld temperature of low temperature (132 ** (working example 5), 134 **, and 136 **) (refer to Table 2 and drawing 2). That is adhesive strength is large also in a low temperature region, and since the powerful change by weld temperature is a flat, a category temperature range is wide. On the other hand, since nonwoven fabri strength changes rapidly near the weld temperature of 139 ** with the nonwoven fabric of the comparative example 2 using the textiles of extension twice, a category temperature range is narrow (refer to drawing 2).

[0054]The nonwoven fabric concerning this invention continues throughout the experiment weld temperature of 132-142 **, excels the comparative example 2 in the loft (refer to Table 2 and drawing 3), and when [said] hot wind weld processing is carried out, it is provided with the physical propertie in which a ** value holdsg in not less than 70cc /in the weld temperature range within the limits of 134 ** - 142 **. Even the weld temperature of 140 or 142 ** excels the comparative example 2 in bulky. That is, also at a bulky point, since the temperature requirement which can be used is wide, it is easy to process it.

[0055]In all the nonwoven fabrics of working example 2-5, as for the degree of breaking extension, th degree of breaking extension showed not less than 100% at all the weld temperature. That is, even if

it makes it elongate initial length's twice, a fracture phenomenon does not occur. It became clear from this that the nonwoven fabric concerning this invention has dramatically large non-destroying deformation. The nonwoven fabric of the comparative example 2 using the drawn fiber on the other hand is as low as 65.2 at the weld temperature of 144 ** 34.1% at the weld temperature of 138 **. That is, the nonwoven fabric of the comparative example 2 cannot be expanded 100%. It became clear from this that the nonwoven fabric of the comparative example 2 has small non-destroying deformation as compared with the nonwoven fabric of working example 2-5 (refer to Table 2 and drawing 4).

[0056]And the nonwoven fabric concerning this invention covers an experiment temperature total range, and the constant stress deformation of a nonwoven fabric face is large (refer to Table 2 and drawing 5). concrete -- the weld temperature range within the limits of 132 ** - 142 ** -- said time of hot wind weld processing being carried out -- constant stress deformation -- 155mm/g/mm -- it has th physical properties holding more than ^{2}. That is, the nonwoven fabric concerning this invention is provided with the characteristic which can change greatly, and is excellent in small power also in respect of the soft nature (softness) of a nonwoven fabric.

[0057]The nonwoven fabric concerning this invention is known [covering an experiment temperature total range, and excelling in (Table 2, refer to drawing 6), and the setting-proof nature of a nonwoven fabric with about 19.9 to 22.3% of elastic-modulus percentage reduction, since it is small, or].

[0058]Thus, if the textiles F in the state concerning this invention where it does not extend are used, a wide range weld temperature of 132-142 ** including the low-temperature range of 132-138 ** can be adopted free, and the nonwoven fabric excellent in setting-proof [nonwoven fabric strength a loft, elasticity, soft nature, and] nature can be manufactured.

[0059]Next, the "examination 1" for verifying the extension recoverability of each nonwoven fabric of working example 2-5 and the comparative example 2 was done. First, each nonwoven fabric was cut down in 140 mm in length, and width of 50 mm in MD directions, and the sample nonwoven fabric was obtained. Then, the sample nonwoven fabric was carefully fixed so that between zippers might be set as 100 mm, and there might be no slack of a nonwoven fabric and load might be set to 0 by th hauling test mode of a universal testing machine (trade name: RTA-100, product made from ORIENTEC). And after making 10, 20, 40, 60, and 80 or 100% of each ductility elongate a sample nonwoven fabric on condition of test period 50 mm/min, extension was continuously recovered on condition of test period 50 mm/min. By this recovery process, displacement (mm) when it became the load 0 was read. Displacement is the position which made the time of 100 mm the starting point 0 between zippers when a sample nonwoven fabric is fixed.

[0060]here -- a following formula -- [-- extension -- recovery -- the time -- load -- zero -- displacement - (-- mm --) -- / -- initial length -- 100 -- mm --] -- x -- 100 -- extension -- a distortion factor -- (-- % --) -- having computed .

[0061]Next, a following formula, a 100-extension distortion factor (%)

It was alike and the extension recovery factor (%) was computed more.

[0062]The result of an extension recovery factor is shown in the next table 3.

[0063]

[Table 3]

伸長回復率（%）		目付 (g/m^2)	伸長率					
種類	融着温度（℃）		10%	20%	40%	60%	80%	100%
実施例2	134	25.0	97.8	93.3	85.6	77.6	64.2	54.8
	136	27.0	97.9	94.1	85.9	78.1	67.2	55.3
	138	22.0	97.8	94.0	86.1	77.4	66.3	54.3
	140	22.6	98.1	94.1	87.0	78.1	66.4	55.0
実施例3	134	23.7	97.5	93.5	86.1	77.9	67.8	55.0
	136	24.4	97.5	94.1	87.4	79.2	69.1	57.1
	138	20.2	97.6	94.3	87.7	78.4	71.2	58.0
	140	23.4	98.7	95.2	88.5	81.2	71.7	60.6
実施例4	134	27.2	97.5	93.9	84.6	76.3	61.0	53.4
	136	29.3	97.4	94.7	86.6	78.1	66.8	51.1
	138	28.1	97.7	94.4	86.4	78.2	66.6	53.5
	140	28.1	97.8	94.4	87.3	78.8	67.9	57.4
実施例5	132	23.7	97.7	95.2	88.3	78.4	63.6	52.6
	134	26.9	97.7	94.4	86.8	77.2	63.2	51.3
	136	24.1	98.5	94.8	87.5	79.4	65.3	52.1
	138	24.4	97.9	95.0	89.2	80.8	67.6	53.1
比較例2	138	22.4	97.5	93.5	—	—	—	—
	144	24.4	98.1	95.1	88.1	77.0	—	—

[0064]Also in the case of a 100% extension rate (it elongates to 2 double length), from Table 3 showr above, the nonwoven fabric of working example 2-5 formed by the non-drawn fiber showed the extension recovery factor of about 50%. It became clear that the nonwoven fabric concerning this invention has from this the physical properties near an elastic body like the rubber which is not in the nonwoven fabric formed from the drawn fiber. It means that it was shown how much initial length was expanded compared with the "extension rate", for example, one 1.5 times the length of initial length was made to elongate 50% of an extension rate (even Table 4 which carries out cited below is the same).

[0065]Next, the "examination 2" for counting the ****** elastic coefficient of each nonwoven fabric of working example 2-5 and the comparative example 2 was done. It is supposed "it is load (gf) at the time of extension" 10, 20, 40, 60, and the load in 80 or 100% of each ductility, this -- extension -- the time -- load -- (-- gf --) -- the above -- an examination -- one -- having asked -- working example -- twc - five -- and -- a comparative example -- two -- each -- ductility -- extension -- a recovery factor -- (-- % --) -- having used -- a following formula -- {-- [-- extension -- the time -- load -- (-- gf --) -- / -- extension -- a recovery factor -- (-- % --) --] -- x -- eyes (g/m2) -- x -- weld -- temperature -- (-- ** --) --} -- / -- 100 - ****** -- an elastic coefficient -- having asked . The result is shown in the following table 4. In this formula, the Reason which has multiplied by eyes and weld temperature is that a nonwoven fabric is so hard that [, so that eyes become high, or] weld temperature becomes high, and there is a tendency for elasticity to be lost.

[0066]

[Table 4]

易伸長弾性係数		目付	伸長率					
種類	融着温度（℃）	(g/m²)	10%	20%	40%	60%	80%	100%
実施例2	134	25.0	131.6	335.2	824.1	1154.5	1483.4	1773.2
	136	27.0	161.1	429.6	928.3	1397.7	1926.7	2402.6
	138	22.0	162.0	374.1	798.5	1213.5	1685.0	2124.1
	140	22.6	119.8	329.8	797.7	1147.4	1537.2	2149.8
実施例3	134	23.7	140.2	310.2	718.8	1082.0	1263.8	1561.9
	136	24.4	115.3	302.4	787.2	1037.1	1533.6	1875.6
	138	20.2	122.8	324.3	633.8	978.4	1264.3	1597.6
	140	23.4	211.6	439.7	786.1	1059.0	1425.3	1865.6
実施例4	134	27.2	202.7	344.1	671.4	1075.7	1314.3	1935.2
	136	29.3	208.9	489.6	937.9	1209.0	1697.9	2329.4
	138	28.1	222.9	564.1	870.9	1365.8	1852.5	2375.4
	140	28.1	235.0	461.0	908.5	1289.8	1711.8	2392.8
実施例5	132	23.7	313.4	405.9	910.6	1141.1	1468.8	1783.3
	134	26.9	285.5	484.7	837.0	1301.3	1535.7	2023.5
	136	24.1	217.1	591.6	959.3	1333.6	1667.0	2108.2
	138	24.4	267.0	604.3	774.0	1497.8	1795.1	2248.5
比較例2	138	22.4	326.3	586.0	—	—	—	—
	144	24.4	386.6	821.7	1605.7	2367.1	—	—

[0067]The nonwoven fabric of Table 4 shown above to working example 2-5 was 1000 or less in all the weld temperature conditions, when the ****** elastic coefficient in 40% of ductility was seen. On the other hand, the nonwoven fabric of the comparative example 2 showed 1605.7 at the ductility of 40%, and the weld temperature of 144 **. This ****** elastic coefficient is an index with which the extension ease of a nonwoven fabric and extension recoverability are expressed exactly.
Being able to elongate a nonwoven fabric by small power, and excelling in extension recoverability is shown, so that the figure is small.
the nonwoven fabric applied to this invention from this -- extension -- it is easy and excelling in extension recoverability is clear.

[0068]As mentioned above, since the nonwoven fabric concerning this invention is provided with as big high elasticity as powerful and it excels also in a loft, soft nature, a hand, and also permanent-set-in-fatigue-proof nature, It is suitable especially as facing, such as a top sheet of a diaper, a sublayer, sanitary items, and since it is suitable also for the female material of a fastening tape, the substrate for filters, and the substrate for poultice, utility value is high.

[0069]Even if it generally compares with the nonwoven fabric of the polyethylene/polypropylene system currently used as a hot wind weld nonwoven fabric, it has the characteristic of excelling in an adhesive property with hot melt, and heat-sealing nature.

[0070]

[Effect of the Invention]Since the textiles for nonwoven fabrics concerning this invention do not extend to the sheath-core type bicomponent fiber which carried out melt spinning and the load of extension

stops requiring for a sheath-core type bicomponent fiber, interfacial peeling of a sheath and a core part can be lost.

[0071]Since the heat shrinkage rate is provided with the characteristic [it is few and] that excel in the weld nature in a low temperature region, and adhesion strength is large, the textiles for nonwoven fabrics concerning this invention, Webb suitable for hot wind weld (exhaust air through) processing at the temperature of a wide temperature requirement can be provided, and the nonwoven fabric which was excellent in the loft using this Webb can be provided.

[0072]Since the textiles for nonwoven fabrics concerning this invention have not been extended, it excels in the nonwoven fabric which consists of single yarn with larger fineness, i.e., a loft, and the distance between textiles and an opening can provide the nonwoven fabric which was greatly excellent in fluid permeability.

[0073]Since it comes to have low shrinkage nature and low temperature adhesion the sheath which consists of a copolymer of a low melting point, the core part which consists of AISOTA tic polypropylene of a high-melting point, and by supposing un-extending the sheath-core type bicomponent fiber ** constituted, a nonwoven fabric can be manufactured by hot wind fusion processing.

[0074]Next, since bulky is large as for the nonwoven fabric concerning this invention and elasticity is large, it excels in bulk recovery nature, and it gets twisted and excels also in the gestalt recoverability over **********. Since it has the characteristic which holds soft tactile feeling, the touch, and aesthetic property, and is provided also with the elasticity of a nonwoven fabric transverse direction, utility value is high.

[0075]Next, in the manufacturing method of the textiles for nonwoven fabrics and the manufacturing method of a nonwoven fabric concerning this invention. Since the energy concerning the time and effort, steam, and electrical and electric equipment which are generated at the time of extension can be saved while being able to reduce the apparatus cost which the stretching device itself is unnecessary and it uses by a manufacturing process, since the stretching process is not included in process, a production cost can be reduced. The range of Webb's large weld temperature is covered, and the nonwoven fabric of a hand powerful, bulky is large and unnecessary [the severe temperature controlling at the time of nonwoven fabric processing] and soft can be manufactured.

[0076]As mentioned above, this invention creates the completely new technical current which was no in the former called the nonwoven fabric which used the textiles in the state where it does not extend, and its production technology.

[Translation done.]